INSTITUTE OF PUBLIC HEALTH COLLEGE OF MEDICINE AND HEALTH SCIENCES UNIVERSITY OF GONDAR

PERCEPTION OF CLIMATE CHANGE AND ASSOCIATED FACTORS AMONG HOUSEHOLD HEADS IN GONDAR ZURIA DISTRICT NORTHWEST ETHIOPIA

THESIS REPORT SUBMITTED TO THE INSTITUTE OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCE UNIVERSITY OF GONDAR IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTTER OF PUBLIC HEALTH IN ENVIRONMENTAL HEALTH SCIENCE.

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May, 2015

Gondar, Ethiopia

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Title: Perception of Climate Change and Associated Factors among Household Heads in Gondar Zuria District Northwest Ethiopia, 2015.

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Acknowledgment

First of all I would like to express my great thanks and appreciation to my advisors Dr.Kassahun Alemu and Mr. Sebsebie Tadesse who helped me in the preparation of this research with full compassion, interest, encouragement, and constructive comments.

Next, my special thanks will be given to University of Gondar; College of Medicine and Health Sciences, institute of public health; post graduate mini library and information technology center staffs for providing internet service, documentation service and necessary reference materials to develop and complete this research.

I would like to thank staffs of the North Gondar zone DOEPLUA and Gondar zuria district environmental experts for their voluntary provision of necessary information. Lastly my acknowledgement goes to the data collectors for their comments giving during training and unreserved work in gathering the data to get quality data for my research.

Acronyms

BOEPLUA	Bureau of Environmental Protection Land Administration and Use
CC K AP	Climate Change Knowledge Attitude and Practice
CC	Climate Chang
FAO	Food and Agricultural Organization
FGD	Focus Group Discussion
HH	Household head
HIV/AIDS	Human Immuno Deficiency Virus/ Acquired Immono efficiency
ICPAC	Climate Prediction and Applications Centre
IGAD	Intergovernmental Authority on Development
IPPC	Intergovernmental Panel on Climate Change
KAP	Knowledge Attitude and Practice
MOH	Ministry of Health
NAPA	National Adaptation Program of Action
NMA	National Meteorological Agency
NMSA	National Meteorological Services Agency
NSF	National Science Foundation's
RVF	Rift Valley Fever
SPCR	Strategic Programme for Climate Resilience
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WHO	World Health Organization
WMO	World Meteorological Organization
COR	Crude Odds Ratio
AOR	Adjusted Odds Ratio

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ABSTRACT

Back ground: Climate change is a significant and emerging threat to public health(1). WHO estimates that climate change already accounts for more than 60,000 deaths globally from climate-related natural disasters every year? Ethiopia has been subjected to drought, floods, new insect pests, new vector-borne diseases and other problems made worse by climate change. Understanding climate change perceptions of the community would help to generate additional information relevant to policy and interventions for the adaptation and mitigation program.

Objectives: To assess Perception of climate change and associated factors among households in Gondar zuria district, Northwest Ethiopia.

Methods: Community based cross sectional study was conducted from March 23- march 27/2015. A total of 427 sample household heads were selected using systematic random sampling method from selected kebeles.The data were collected using an interviewer administrated questionnaire. The Data was entered and analyzed by epi-info version 7 and SPSS version 16. For further analysis bivariable and multivariable logistic regression were used to find out the association between independent and outcome variables. The result was presented & interpreted at (p-value ≤ 0.05 considered as statically significant).

Result: Out of the total respondents 238 (58.5%) had good overall perception towards climate change causes and effects. 78.8% and 77.8% of the respondents have perceived that temperatures and rainfall pattern has become changed respectively. The multivariable logistic regression analysis showed knowledge (AOR:1.8, 95%CI:1.04-3.20), wealth index (AOR: 7.45, 95%CI:3.30-16.00), access to climate information (AOR: 6.80, 95%CI:4.1-11.9), farming experiences (AOR:7.8, 95%CI :2.46-24.8), and occupational status (AOR:2.9, 95%CI:1.22-7.13) of the head of household were statistically significant independent predictors of climate change perception.

Conclusion: The levels of CC perceptions among respondents were inadequate to mitigate and adapt the change in climate. Knowledge, wealth index, access to climate information, farming experiences and occupation of the head of household were statistically significant with climate change perception.

Key words:- climate change, perception, northwest Ethiopia, associated factors.

1. Introduction

1.1. Background

Climate is an average atmospheric condition of a place for a long period of time usually 35 years and above. Climate change refer to any change in climate over time whether due to natural variability or as a result of human activities (2, 3). Human activity is altering the climate through the process of global warming resulting from an unprecedented accumulation of green house gases (GHGs) into the atmosphere. Major GHGs include carbon dioxide (CO2) mostly from fossil fuel and land-use change and methane (CH4) and nitrous oxide (NO2) (4).

Climate change is one of the most important global environmental challenges, with implications for food production, water supply, health, energy, etc. Addressing climate change requires a good scientific understanding as well as coordinated action both at national and global level (5). Climate related diseases: An environment characterized by warming and rainfall extremes will change the occurrence and spatial patterns of vector- and water-borne diseases (4).

Ethiopia is one of the countries vulnerable to climate change and losses of human lives from frequency and intensity of drought, flooding, domestic water supply shortages, malnutrition and the altitudinal extension of malaria transmission are increasingly being reported (6). Flooding is one of the climate related hazard that affects human health in several ways such as death, injuries, water-borne diseases, malnutrition, and mental ill health (7). the mean annual temperature across the country is projected to increase between 0.9 and 1.1 °C by the year 2030(6). As a result of such climatic changes, frequency and intensity of drought is likely to increasingly present a serious threat to the rural farming communities (8).

1.2. Statement of the problem

Globally, climate change has emerged as a major scientific, developmental and political issue in the past two decades. It is a global phenomenon the impacts of which will affect all countries, but more so the poorer and vulnerable countries of Africa that are least responsible for it (1). The global climate is altering dangerously due to various natural and anthropogenic reasons. The global average temperature has increased by about 0.6 degree centigrade and the concentration of methane has increased by 151% (7, 9). The WHO estimates that CC already accounts for more than 60,000 deaths globally from climate-related natural disasters every year,4 along with at least another 100,000 deaths from malaria, malnutrition, and child diarrhea (10, 11)

Africa, mainly the Sahel, the Horn of Africa and Southern Africa, has been challenged by the impact of drought since the 1960s. Millions of people are affected due to crop failures and water scarcity as caused by climate change (8, 12). Some of the effects of climate change are related to more variable weather, heat waves, heavy precipitation events, flooding, droughts, and more intense storms such as hurricanes, sea level rise, and air pollution(1, 13).

In Ethiopia average annual mean minimum temperature throughout the country indicates an increase of 0.37^{oC} every decade (6). Climate change is a significant and emerging threat to public health, especially in lower income populations. In the last decade, the country has been subjected to drought, floods, new insect pests, new vector-borne diseases and other problems made worse by climate change (1, 14). According to the 2007 report of the NAPA, (6) .Major losses of human lives and property were reported from different parts of Ethiopia, For instance, in 2006, flooding took 256 human lives in Dire Dawa Town and 364 lives in South Omo Zone. More than 10000, 6000 and 16000 inhabitants of Dire Dawa, South Omo, and West Shewa zones, respectively were become homeless due to river flooding in 2006.(6, 7).

Knowledge and perceptions of climatic change are vital entry points for decision makers and policy makers to learn how and where to enhance the adaptive capacity of peoples in rainy and drought periods (15). A previous study in Nigeria on climate change perception prevalence indicates that 89.4% has been a change in climate and in ((16).In Ethiopia

86.7% of the interviewed household heads perceived an “increase” in temperature volume(17)

Few studies have been conducted in Ethiopia on climate change perception at the institutional level (7, 18) but, they are not community based and there were another study conducted at national level (17, 19). The previous studies were very relevant in providing good information for performing this specific study however; the study had limitation with that they are too broad, not considering specific location or local people’s climate change perception. Therefore this study will contribute to address this gap by assessing the perception of CC at community level.

1.3. Literature review

Over the past 150 years, the global mean surface temperature has increased by 0.76°C.(10) Global warming has caused greater climatic volatility such as changes in precipitation patterns and increased frequency and intensity of extreme weather events and has led to a rise in mean global sea levels (12). It is widely believed that climate change is largely the result of anthropogenic greenhouse gas (GHG) emissions (5, 8). climate change is already happening with multifaceted effects for human society and the environment.(20)

Concentration of carbon dioxide has increased from 280 parts per million (ppm) in the pre-industrial times (1750s) to 370 ppm at present and it is estimated that, with the present trend, the concentration will range between 540 and 970 ppm in the year 2100 (21). Climate Change projections included: A “very likely” increase in frequency of heat extremes, heat waves and heavy precipitation; “Likely “increase in tropical cyclone intensity; “Very likely” precipitation increases in high latitudes and likely decreases in most sub-tropical land regions (8, 10).

Causes and impacts of climate change

Climate change is a reality; it has changed in the past, it is changing at the present, and it will change in the future. The overwhelming majority of climate change researchers have reached the understanding-based on decades of evidence, modeling, and debate-that it is

extremely likely that human activities are responsible for the rising temperatures on Earth(8). Human behavior will continue to be a major factor in climate change (22, 23).

The human factors that contribute to climate change are in the form of greenhouse gas (GHG) emissions and land-use/cover changes (12, 24). Most important greenhouse gases are emitted from electric power station, various industries, the transport sector and deforestation due to human activities. These activities increase the concentration of different greenhouse gases.

Global increases of CO2 concentrations are primarily due to increased fossil fuel use and land-use change. It is very likely that the observed increase in CH4 concentration is predominantly due to agriculture and fossil fuel use. The increase in N2O concentration is primarily due to agriculture (8). Thus, the greenhouse effect is intensified, resulting in rising temperature on earth.

Health Impacts

Research on the health effects of CC has focused largely on direct physical health impacts, principally death and injury from extreme-weather events, impacts of increased temperatures and heat waves, spread of vector-borne disease, air quality and respiratory illness, and changes in food and water quality and availability(25).

The WHO estimates that CC already accounts for more than 60,000 deaths globally from climate-related natural disasters every year,[4] along with at least another 100,000 deaths from malaria, malnutrition, and child diarrhea (10, 11).

Agriculture

Agriculture is the basis for the livelihoods of millions of people in Africa. However, agricultural production is affected by climate change. The estimate for Africa is that 25% to 42% of species habitats could be lost, affecting both food and non-food crops. African countries were identified as having the highest vulnerability to drought. The Sahel situated at the southern fringe of the Sahara desert and stretching from the West African coast to the East African highlands is particularly prone to drought. For instance, estimates suggest that one third of African people live in drought-prone areas and that around 220 million people are annually exposed to drought (26).

Climate change in Africa

Long-term drought continued in parts of the Greater Horn of Africa, including southern Somalia, eastern Kenya, south-eastern Ethiopia, and north-eastern United Republic of Tanzania and Djibouti, with 11 million people at risk of starvation (12).Africa is vulnerable to a number of climate sensitive diseases including malaria, tuberculosis and diarrhea. Under climate change, rising temperatures are changing the geographical distribution of disease vectors, which are migrating to new areas, and higher altitudes (27).

Global response to climate change

Different institutions were established to monitor and follow up the issue very closely. The Kyoto Protocol commits developed country to reduce on average 5.2% of their 1990 greenhouse gas emissions by 2010. These countries agreed to reduce their overall emissions of six greenhouse gases by an average of 5% below 1990 levels between 2008 to 2012 (20, 21). Approximately 40% of the world's population or 1.9 billion persons worldwide are unaware of climate change. Of the 60% that were aware of climate change, when asked "Temperature rise is a part of global warming or climate change (28).

Climate change impacts and responses in Ethiopia

Ethiopia is a country with a very diverse climate. In general, climate patterns are highly variable and unpredictable. The country also has a history of experiencing climate extremes, such as droughts and floods, increasing temperature, and unreliable rainfall (6, 20). Ethiopia is highly vulnerable to climate variability and change. This is because of very high dependence on rain fed agriculture, which is very sensitive to climate variability and change, under-development of water resources, low health service coverage, high population growth rate, low economic development level, low adaptive capacity, inadequate road infrastructure in drought prone areas, weak institutions and lack of awareness Vulnerability assessment based on existing information and rapid assessments carried out under National Adaptation program of Action of Ethiopia (NAPA) has indicated that the most vulnerable sectors to climate variability and change are agriculture, water resources and human health (6).

Drought severely affects the hydropower generation capacity, Ethiopian's main source of electricity. Flooding in turn causes significant damage to settlements and infrastructure, livestock and human health, and the water-logging of productive land undermines agriculture by delaying planting, reducing yields, and compromising the quality of crops, especially if the rains occur around harvest time (29).

Responses to climate change in Ethiopia

The Ethiopian government has recognized climate change has adverse effect on the country's development agenda. As a result, the country ratified the UNFCCC (in May 1994), UNCCD (in June 1997) and Kyoto protocol (February 2005). Within these frameworks, Ethiopia prepared national adaptation programs of Action (NAPA) against the impacts of climate change and desertification (6). Unlike the case of developed nations, the practical measures expected from Ethiopia is to reduce the impact of climate change through the development of local adaptation measures while lobbying for mitigation options, international solidarity and climate justice (20).

Most of the coping mechanisms are based on local knowledge and cannot be able to cope with all of climate change impacts. However, local perception of people should be the base for the choice of adaptation strategies. Unfortunately no or little is known about local perception of people (6).

Level of perception to climate change and adaptation response

A previous study in Nigeria on climate change perception prevalence indicates that 89.4% has been a change in climate. About two-thirds of respondents had a positive attitude to causes of CC, while half had a positive attitude to the effects of CC (11).

Considering the issues of environmental change 86% opine that the environment has been changing over the years due human activities, such as farming, deforestation either by cutting down of trees for fuel, roofing, farmlands extension, furniture; overgrazing, bush burning, urbanization and industrialization. 84% of the respondents opined that climate change is a critical environmental issue that needs immediate attention. In the same vain 73% of the respondents believe that temperature has been rising over the past few decades, 83.5% of them expressed that rainfall is decreasing every yea (3).

Factors affecting the community perception of climate change

Local community's perception about their environment is critical because their perception fundamentally determine the socioeconomic activities in their locality (11) . Studies in Nigeria show that 97. 5% of the poor are mostly affected by the incidence of climate change but due to lack of money to acquired modern techniques all influences the drive towards adapting to climate change (3). Studies conducted in Nigeria indicate Occupational status was significantly associated with likelihood of having a positive attitude. From each stratum of occupational status to another, respondents were 1.3 times more likely to have a positive attitude about causes of CC than those in the lower occupational stratum(3). Another study indicates that significant association was found between educational status and attitude to causes of CC where as marital status was not. (11).

Farmer's age, level of education, farming experience are some of the important socio-economic characteristics that influence farmers' perception and adaptation strategies (30). Experienced farmers and more elderly inhabitants were more inclined that temperature has increased and rainfall quantity is falling (3).

In Nigeria Studies show that deforestation, industrialization and liquid waste and air pollution are the major drivers of climate change as a result temperature is increasing and the level of rainfall is declining (30).

Climate change directly affects variation in temperature and rainfall patterns, soil moisture and sea levels rise, ice caps and glaciers in polar and coastal regions melt, and increased incidences of catastrophic drought, flooding and disease epidemics in the tropical and subtropical regions occur (8, 12) .Studies in Ethiopia show that 86.7% of the interviewed household heads perceived an "increase" in temperature volume. On the other hand, 85.2% of the respondents felt an increase in heat intensity; (88.3%) perceived the change in the amount of rainfall. Out of 88.3% respondent who perceived the change in rainfall amount (17)

1.4. Justification of the study

Africa is the continent most vulnerable to the impacts of climate change, due to increases in both droughts and floods, the epidemic potential of many infectious diseases and low capacity of nations and communities to adapt to climate change (27). Climate change affects human health and wellbeing in several ways, notably by increasing the distribution and transmission of several vector borne infectious diseases, and diseases related to heat stress.

In Ethiopia, one the most vulnerable sectors to climate variability and change are human health(14). Flooding is one of the climate related hazard that affects human health in several ways (6, 7). Few studies have been conducted in Ethiopia on climate change perception at the institutional level and at the national level(7, 18) However, the study were not community based and the studies had limitation with that they are too broad, not considering specific location or local people's climate change perception. Therefore the previous studies were very relevant in providing good information for performing this specific study, unfortunately no or little is known about local perception of people.

The results could be used in the design of climate change knowledge and perception programme and a communication strategy to improve existing perception, thereby increasing countries capability for adapting to climate change and for building a climate change resilient society, environment and economy.

Conceptual framework HH perception towards CC Gondar zuria, 2015.

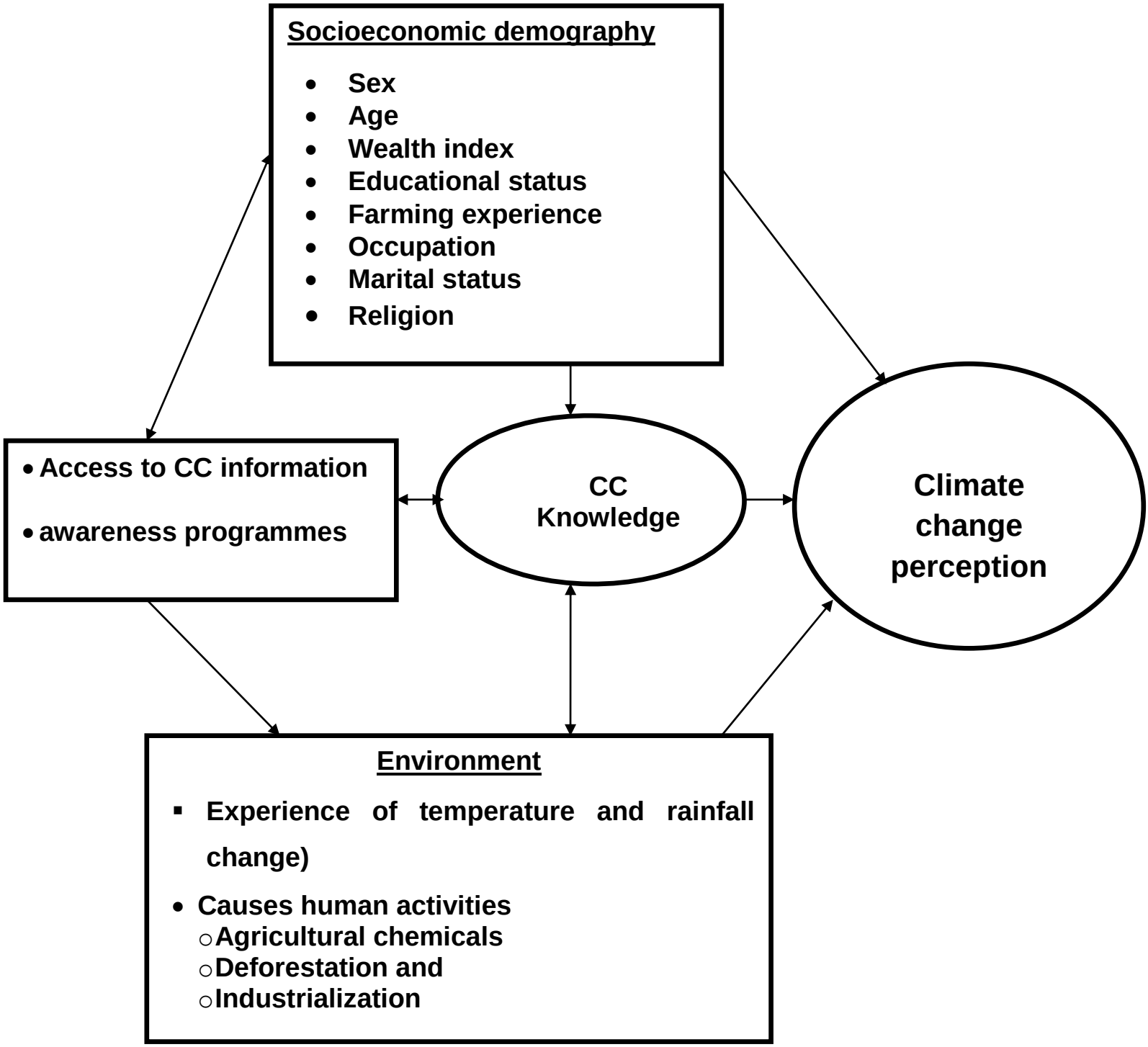

Figure1: Conceptual framework for Climate change perception (adopted from Bewket Amkdu,2013 (17))

2. Objective

General objective

- To assess perception of climate change and associated factors among households in Gondar zuria woreda, Northwest Ethiopia, 2015.

Specific objective

- To determine the level of perception on climate change (perception on climate trends, causes and effect) among households in Gondar zuria woreda, northwest Ethiopia, 2015.
- To identify factors associated with perception of climate changes among households heads in the study area.

3. Methods

3.1. Study setting and period

Community based cross sectional study was conducted to assess perceptions towards climate change trend, cause and effects. Study period, the study was conducted from March 23- march 27/2015.

Study setting

The study was conducted in Gondar zuria district. The district found south of the Gondar city at a distance of 40km from Gondar city and 140km from Bahirdar city. The district has 38 kebele administrations with 35 rural and 3 urban kebeles. The woreda had a total population of 191,394, of whom 97,388 were men and 94,006 women; 18,377 or 9.60% were urban inhabitants. Gondar Zuriya has a population density of 172.66, which is greater than the Zone average of 63.76 persons per square kilometer. A total of 42,753 households were counted in this, resulting in an average of 4.48 persons to a household, and 41,182 housing units. The total land mass of the was1,108.53 square kilometers (31).The average annual rainfall ranges between 840 to 1220 mm with average annual temperature between 20°C and 26°C (32).

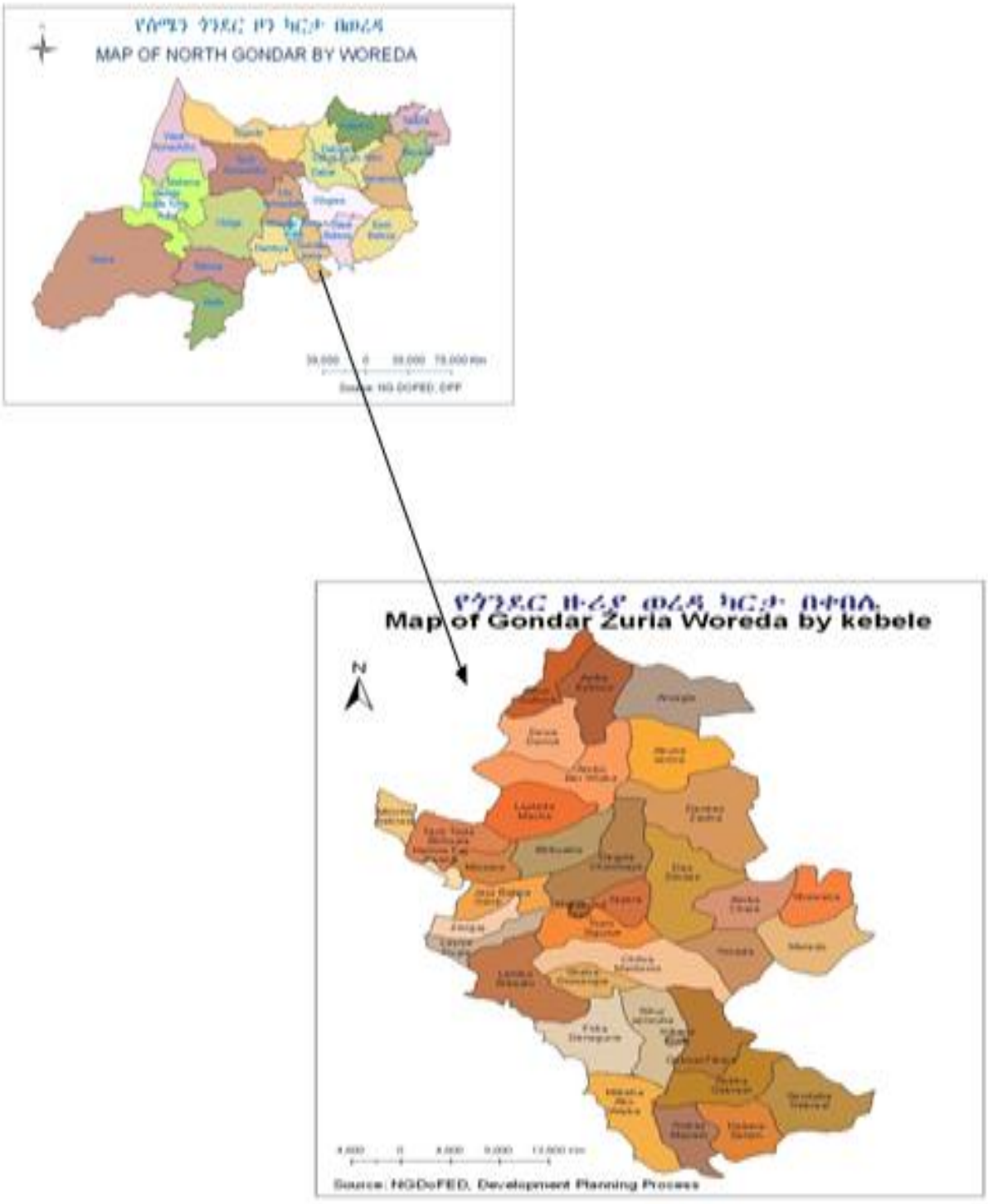

Figure 2. Location map of Gondar zuria district from North Gondar zone Department of Economy Development.

3.2. Source and study Population

Source population: - All heads of the household permanently living in Gondar zuria District were the source population.

Study population: - From the selected kebele heads of the households' were the study population; systematically selected households from randomly selected kebeles was the study sample unit and the study unit was household heads.

3.3. Inclusion and exclusion criteria

Inclusion criteria: Head of the household who were permanently living (>6 month) in the kebele were included in the study.

Exclusion criteria: Households whose age less than 18 years excluded in the study.

3.4. Sample size determination and sampling procedure

Sample size determination

Sample-size estimation was determined by using epi-info version 7 calculators with the following assumption.

using similar studies conducted in Ethiopia prevalence of perception on CC indicates that 85.2% (17). 95% level of confidence and 5% margin of error was used to get the sample size which is n= 194. By considering Design effect correction 2×194, n= 388 and 10% non-response rate final sample size were n= 388+39 = 427.

For the second objectives (factors affecting perception)

Factors	Outcome in unexposed (%)	Outcome on exposed (%)	CL and power assumption	prevalence	Sample size
Educational status	89.4	36	**(**95%,80)	4.3	**146**
Farming experience	42.9	91	**(**95%,80)	13	**36**

Since the first objective sample size was greater than from those calculated by different factors. Therefore the maximum sample size 427 was used for this study

3.5. Study variables

Outcome variables: Perception of climate changes on causes and effect (good perception vs. poor perception).

Independent variable

Socio demographic variables: Sex, Age, Educational status, Farming experience, **Wealth index, occupation, access to CC information.**

Knowledge: Respondents knowledge about climate change (having good or poor knowledge)

Access to CC information: (presence and absence of TV, radio)

Environmental: Effects of weather events (temperature and /rainfall change) and Causes, i.e. Human activities (deforestation, industrialization, agricultural chemicals)

3.6. Sampling procedure

Two stage sampling methods were employed. Simple random sampling for selecting representative kebeles and systematic random sampling procedure were used to determine sample households for the study. In the first step 7 kebeles from the districts was selected by a simple random sampling technique utilizing the lottery method from the existing 38 kebeles in the district. In the second step according to probability proportional to size a total of 427 sample household heads were selected using systematic random sampling method from selected kebeles. Finally for each household, individual household heads were interviewed.

Schematic diagram for sampling procedure

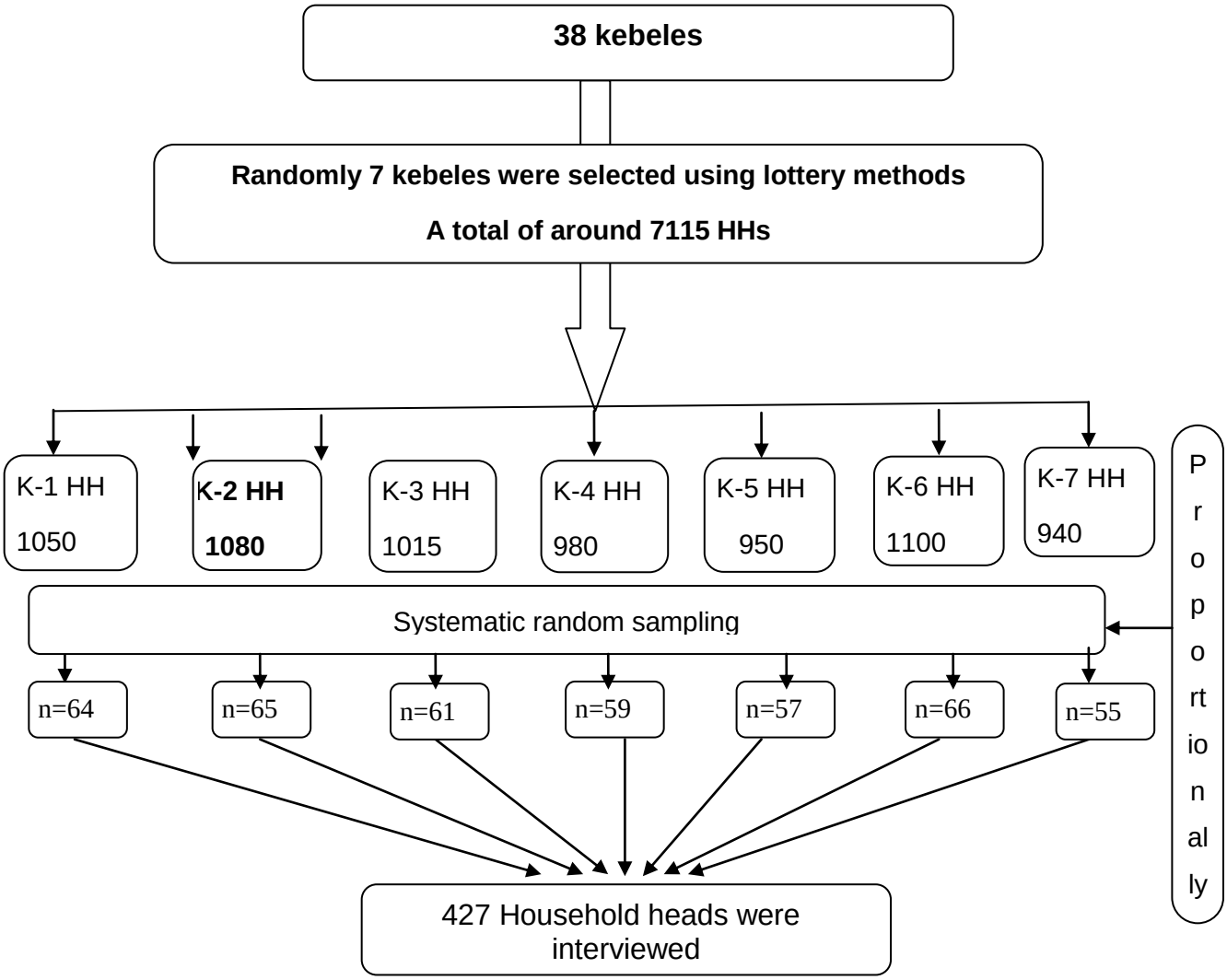

Figure 3.Schematic diagram for sampling procedure of Gondar zuria district HHS.

3.7. Data collection instruments /tools/

Quantitative data collection method was employed for the research. The data was collected from selected household heads using structured questionnaire. The questionnaire includes information about the socio demographic characteristics of the respondents, knowledge of respondents on climate change, perception of the Type of climate change experienced, perception of the causes and effects of climate change in the study area. Perception of respondents was gauged by using of Likert Rating Scale. A number of perception questions on climate change were asked and responses were received based on respondents' level of agreement or disagreement. The HH perception on climate change was assessed based on responses to 24 paired Likert Scale statements. The items were weighted 1-5 in which case 1 = Strongly Disagree and 5 = Strongly Agree. The "no opinion" responses, rated 3 in the Likert scale, were rerated zero during analysis to omit their effect as they had a tendency of increasing the final score despite their reflection of a lack of awareness. A summative approach was used and the mean value calculated. The mean score of respondents were computed and those respondent Scores greater than or equal to the mean accepted as significant while those score below the mean regarded as not significant **(33).**

3.8. Operational definition

Climate change: climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."(Trained of change in temperature, rain fall pattern, occurrence of flood, drought).

Climate change Perception: is the process of attaining understanding of sensory information which includes personal view of change in climate and an opinion or general feeling about climate change (33). Perception of respondents was gauged by using of a 5- point Likert Scale statements which includes Household head perception towards changes in temperature and rainfall pattern over the last 20 years and Household head perception on causes and effects of climate change. After summation of 24 likert scale

statements the mean score were computed. Respondents scored above the mean considered as having good perception and those scored below the mean considered as having poor perception.

Climate change Knowledge:

Knowledge about climate change evaluates respondents' with respect to what climate change mean. The scale consists of 14 yes and no questions. Knowledge was measured by using the scoring system for each yes answer a score of one point was given and a score of zero point for no answers. The mean of respondents' scores was taken as cut-off point in identifying household heads with good and those with poor knowledge of climate change. household heads scoring greater than or equal to the mean (correctly answering a minimum of 9 out of the 14 questions) were regarded as good knowledgeable while those who scored below the mean were classified as having poor knowledge about climate change(7).

Wealth status: The wealth of respondents was determined by collecting the different asset data what they do have and analyzing the data using statistical soft ware by principal component analysis technique**.** Based on this the first rank (19.5% of respondents) were considered as very poor, the second (30.5%)= poor, the third one(22.5%)=rich and the fourth on(19.5%)was considered as very rich.

3.9. Data management and analysis procedure

Pre-tested and interviewer-administered questionnaire were used to collect household data. The interview was conducted by trained research assistants who were working in the district (3 development agents and 4 environmental protection experts were get 1 day training and participated in data collection).

Data were entered using statistical software Epi- info version 7 and the data was coded, edited and analyzed using SPSS version 16. Data obtained from various sources was analyzed using quantitative data analysis techniques. The data generated by questionnaire were analyzed using descriptive statistics. Descriptive statistics such as mean, frequency, percentage and count were used to characterize community" perception on cause and effects of CC, temperature, rain fall pattern and other variables.

Both binary and multivariable logistic regressions were computed to find out the association between independent variable and outcome variables. The binary logistic regression were computed at p-value ≤ 0.2 considered as significant. Variables found to have an association with the dependent variable would then be entered in to multivariable logistic regression for controlling the possible confounding effect. Finally the variable which has significant association identified on the basis of OR with 95% CI and p-value≤ 0.05. Hosmer and lemshow test was used to fit the final regression model (0.857).

3.10. Ethical consideration

Approval to conduct the study was obtained from the Research Ethics Committee of Gondar university college of medicine and health science institute of public health. Permissions were also obtained from the local leaders of communities selected to take part in the study. By explaining the rationale for the study to the respondents, written informed consent was obtained from each respondent. The respondents who could not read or write were give their consent through thumbprints and verbal consent. The information collected from this study was confidential stored in a file and locked with key. Information collected by this study was, without respondents name, but a code number assigned to it and it could not revealed to anyone except the principal investigator.

4. Result

4.1. Demographic characteristics of respondents

Out of the 427 household heads sampled for the study, 407 (95.3%) completed the questionnaire. 20 (4.7%) HHS refused to participate. The survey results reveals that out of 407 household heads 90(22.1%) and 317(77.9%) were female-headed and male-headed households respectively. The age distribution of the respondents ranges from 18-85 years with an average age of 45.4 years, median 45 years and the inter quartile ranges was 35-53 years. Regarding marital status, 348(85.5%) of the respondents are married, while 30(7.4%) of them are unmarried (Table 1).

Interims of religious composition, the survey results showed that of the total household heads included in the survey 90.2% of the survey households are believer of orthodox Christianity. Most of the respondents are farmers (82.5%), and the rest are mixed. Majority (80%) of the respondents had more than 15 years of farming experience having 26 years mean experience with min 1 year and maximum 70 year **(Table 1).**
As shown in table 1, more than half of (53.5%) of the household heads were literate with formal & informal education of any kind and thus are able to read and write. about 27.8% of the respondents stated that they could not read and write.

Regarding household wealth, it was difficult to establish because the respondents could hardly tell sincerely their assets. However, an attempt had been made to know their asset by giving brief explanation of the purpose of the data. Accordingly, the wealth distribution of the respondents ranges from very poor to very rich. Of the total respondents 22.5 % and 19.5% were rich and very rich respectively. Whereas 30.5 % and 27.5 % of the respondents were poor and very poor respectively.

Table 1: showed socio-demographic characteristics of respondents in Gondar zuria district, Northwest Ethiopia, 2015.

Characteristics of the respondents	Frequency	%
Age (N=407)		
18 – 30 years	55	13.5
31 – 40 years	117	28.7
41 – 50 years	116	28.5
51 - 60 years	70	17.2
> 60 years	49	12.0
Sex (N=407)		
Male	317	77.8
Female	90	22.2
Marital status(N=407)		
Married	348	85.5
Not married	30	7.4
Divorce	16	3.9
Widowed	13	3.2
Educational status(N=407)		
Cannot read & write	111	27.8
Can read & write	214	53.5
First cycle complete & above	75	18.5
Religion(N=407)		
Orthodox	367	90.2
Muslim	40	9.6
Occupation(N=407)		
Farmer	330	81.0
Mixed (merchant/farmer)	77	18.9
farming experience(N=407)		
1 – 15 years	83	20.4
16 – 30 years	146	35.9
31 –45 years	64	15.7
46 - 60 years	39	9.6
> 60 years	75	18.4
Wealth status(n=407)		
very poor	110	27.5
Poor	122	30.5
Rich	90	22.5
Very rich	78	19.5
Access to information(407)		
No	155	38.1
Ye	252	61.9

4.2. Household head knowledge of climate change

Study revealed that 288(70.2%) of the respondents have good CC knowledge where as 29.8% of the respondent scored below the mean have poor knowledge .The study report revealed that most of the HH, more than 347(85.3) and 328(80.6) of the respondents were heard and understands what climate change mean respectively **(Table 2).**In addition to the meaning of climate change, the knowledge of respondents about the relation of CC with drought and human health were also captured. More than 372(91.4%) respondents knew that drought could have relation with deforestation and 330(81.1) respondents knew that CC could relate to human disease **(Table 2).**

Table: 2 HH knowledge of CC among HH in Gondar zuria district Northwest Ethiopia, 2015.

A. Over all Knowledge of household heads about climate change(= 407)		
Knowledge variables	**Frequency (%)**	
	yes	no
Have you heard of the word “climate change” before?	348(85.3)	59(14.5)
Do you know what “climate change” mean?	328(80.6)	79(19.4)
Do you know the cause of climate change?	318(78.1)	89(21.9)
Do you know the effect of climate change?	321(78.9)	86(21.1)
Do you know environmental laws and regulations?	291(71.5)	116(28.5)
Do you know that drought related with deforestation?	372(91.4)	35(8.6)
Do you know that temperature related with air pollution?	350(86.0)	57(14.0)
Do you know that rainfall related with CC?	349(85.7)	58(14.3)
Do you know that flooding related with GW?	325(79.9)	82(20.1)
Do you know that human disease related with CC?	330(81.1)	77(18.9)
Do you know that agri. productivity related with CC?	363(89.2)	44(10.8)
Do you know that river drying related with CC?	363(89.2)	44(10.8)

4.3. Household head perception of climate change

A. Overall respondents level of perception on CC

The overall result showed that 58.5% of the respondent had good perception whereas 41.5% of the respondent had poor perception.

Perceptions of respondents on Temperature and rainfall changing in the past 20 years

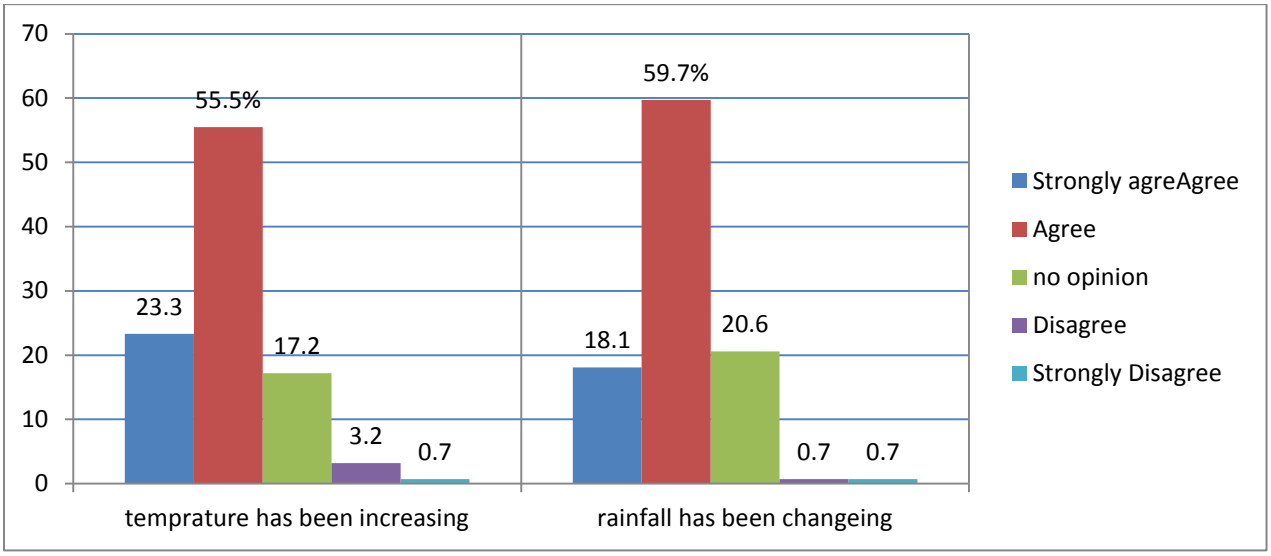

Figure: 4 Respondents perception on temperature & rainfall change in the past 20 years among HH in Gondar zuria district Northwest Ethiopia, 2015.

The survey result also reveals that out of the total household heads included in the survey 55.5% and 23.35 of the respondent agreed and strongly agreed with increased in temperature respectively **(figure: 4).**

In the survey, the respondents were asked to identify some of changes they have observed in the environment resulting from changes in temperature over the past two decades. The result revealed that Prevalence of newly introduced human and animal disease (62.7%), dry up of rivers and streams (72.5%), were some of indicators in the environment reported by the respondents as a result of changed temperature and rain fall over time **(Table 3)**

Table.3: Indicators to evaluate the temperature change and rain fall pattern among HH in Gondar zuria district Northwest Ethiopia, 2015. (N=407).

I. Temperature change in the area		
variables (Indicators)	**frequency**	**Percent**
Prevalence of newly introduced human and animal disease	255	62.7
Prevalence of newly introduced plant and animal species	157	38.6
Change in clothing style	253	62.2
Dry up of rivers and streams	295	72.5
Habitat shift towards higher location	167	41.0
Damage of crops by pests	219	53.8
II. Rainfall pattern change in the area.		
variables (Indicators)	**frequency**	**Percent**
Loss of some animal and plant species	204	50.1
Increased drought frequency	267	65.6
Increased flood frequency	260	63.9
crop Growing period shortened	244	60.0
Rainfall comes early	272	66.8
Rainfall comes lately	291	71.5
Decline of agricultural yields	279	68.6
Decreased available water	209	51.4

The survey result reveals that 77.95 of the respondent household heads included in the survey perceived change in pattern or trend of rainfall amount and distribution whereas only 1.4% of the respondents perceived that they disagree in rainfall change trend. **(Figure: 5).**

In the survey, local people were asked to tell what indicators they have been using to perceive changes in rainfall pattern over the last two decades. Their responses revealed that shortening of crop growing period (60%), rainfall comes early (66.8%) or lately (71.5%), (decline of agricultural yields (68.6%) ,increased frequency of occurrence of

drought ,flood (65.6%,63.9%)and decreased available water (51.4%) and loss of animal and plant species (50.1%) were reported as indicators of changes in rainfall in the area over the past 20 years**(Table 3.**

A. Respondent's perception on the causes of CC

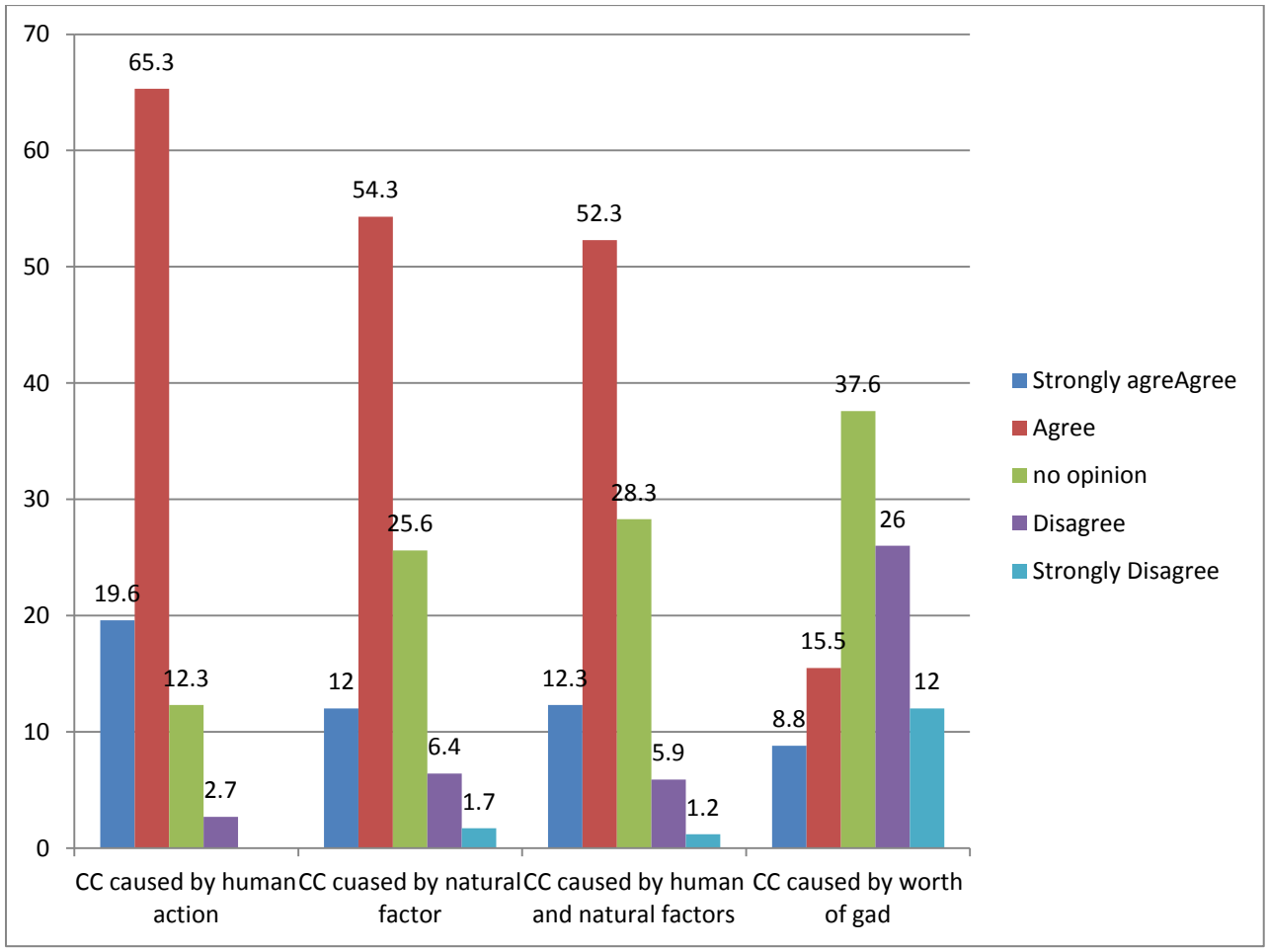

Figure: 5 respondent's agreement on the causes of CC among HH in Gondar zuria district Northwest Ethiopia, 2015.

The above figure shows a breakdown of public perception on the causes of climate change. Among the total respondent 65.4% agree that human activity alone was responsible for climate change whereas only 1.2% disagree on this statement. 52.2% of respondents believed that the main cause of climate change was a combination of human activity and natural processes while around 28% have no opinion about the idea. 54.3% of the respondents agree that natural processes alone were the main cause of climate change and to the reveres 7% of the respondents disagree about this idea **(Figure 5).**

Table 4: HH Perceived human cause of climate change (N=407 multiple answers) among HH in Gondar zuria district Northwest Ethiopia, 2015. .

variables (Perceived causes=multiple answers)	frequency	Percent
Over cultivation	240	59.0
Overgrazing	259	63.6
Deforestation	369	90.7
Forest Fires	318	78.1
Using Agrochemicals	149	36.6
Population pressure	271	66.6
Use of fossil fuels	159	39.1
Poor industrial practices	117	28.7
Solid and Liquid waste	112	27.5
Air pollution	111	27.3
Transportation,(Vehicle emissions)	72	17.7

B. HH perception to climate change effects

Perceived climate change Effect

As regard the effects of climate change, the respondents agreed that all the perception question on CC effect (on our sustainability, droughts, Floods, human health, river drying, agri. productivity…), were the commonly cited events that most respondents associated with climate change induced hazards **(Figure 6).**

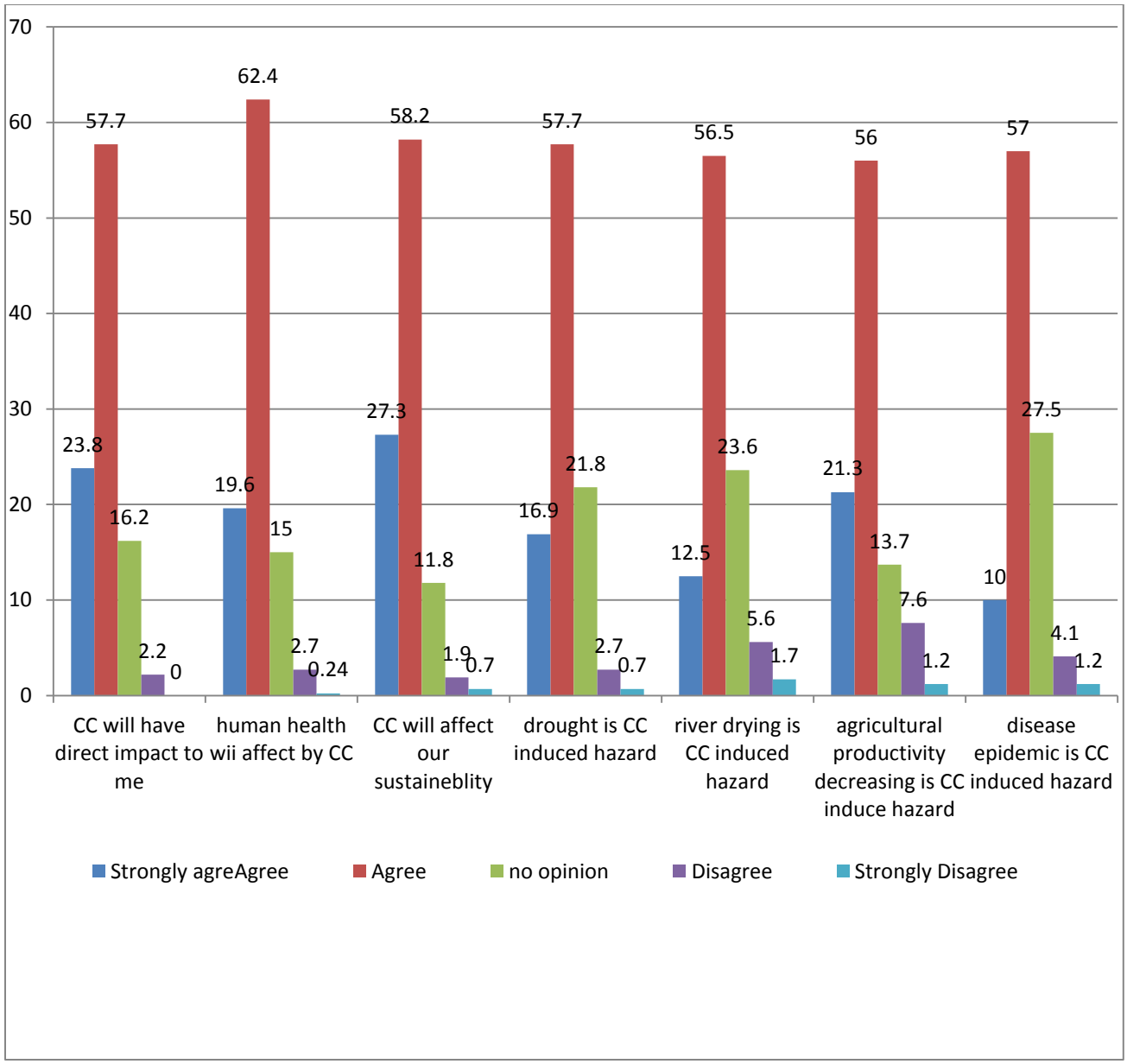

Figure: 6 respondent's agreement on Perceived climate change Effect among HH in Gondar zuria district Northwest Ethiopia, 2015.

More than half of respondents (57.7%) agreed that changes to the climate have had a direct impact on them ,however 16 %,2.2% of respondents no opined and disagreed with this statement, as illustrated in **(Figure 6).**

Table5: Perceived possible solutions of CC among HH in Gondar zuria district Northwest Ethiopia, 2015. (N=407, Multiple answers).

variables	frequency	percent
Reforestation	346	85.0
Enhance irrigation	233	57.2
Use of organic manure	240	59.0
Stops cultivation of sloppy area	259	63.6
Soil and water conservation	299	73.5
Family planning	313	76.9
Rainwater harvesting	172	42.3
Change in cropping pattern	172	42.3
Diversified income	131	32.2
Growing short maturing crops	193	47.4

C. Source of information on climate change (multiple answer)

Increasing people's knowledge on climate change through different mechanism is an important measure to persuade people at all levels in the community to play an active role in mitigating and adapting to climate change. The respondents reported that the major sources of climate change information were radio 267(65.6%) and training/conference/ 265(65.1%) respectively while 123 (30.2%), 90 (22.1%), and 74 (18.2%) of them said that they had received information on climate change from colleague/friends, television and schools respectively **(Figure 7).**

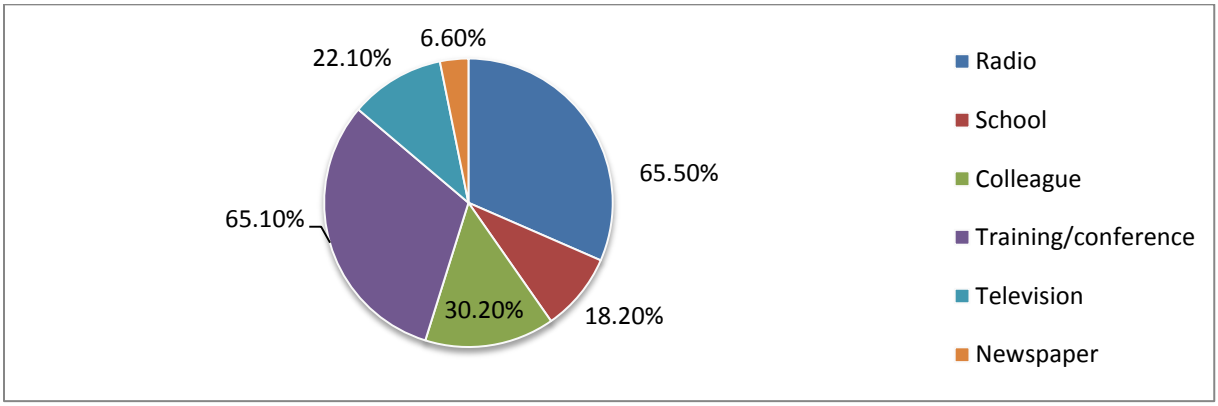

Figure:7 Source of information about CC among HH in Gondar zuria district Northwest Ethiopia, 2015.

Table 6: Factors associated with perception towards CC in Gondar zuria district, Northwest Ethiopia, 2015.

Demographic variables	Frequency (%)		Odds Ratio		p-value
	Poor	Good	COR (95% CI)	AOR(95% CI)	
Overall knowledge					
Poor	66(16.3)	53(13)	1		
Good	103(25.3)	185(45.4)	2.23(1.44-3.40)	1.8(1.04-3.20)	0.03
Respondents wealth index					
very poor	66(16.3)	44(10.8)	1		
Poor	57(14)	65(16)	1.71(1.01-2.8)	2.0(1.03-3.70)	.028
Rich	28(6.9)	63(15.5)	3.37(1.81-6.0)	3.61(1.70-7.50)	.000
very rich	18(4.4)	66(16.3)	5.50(2.8-10.49)	7.45(3.30-16.00)	.000
Respondents accesses to CC information					
No	104(25.5)	51(12.5)	1		
Yes	65()16	187(45.9)	5.9(3.84-9.24)	6.80(4.1-11.9)	0.00
farm experience					
1-15 years	54(13.1)	29(7.1)	1		
16-30 years	20(5)	19(4.6)	1.769(0.8-3.8)	1.51(2.46-24.80)	0.50
31-45 years	27(6.6)	48(11.8)	3.310(1.7-6.3)	2.61(1.10-2.28)	0.03
46-60 years	50(12.3)	96(23.6)	3.575(2.0-6.29)	4.0(1.91-8.60)	0.00
>60	18(4.4)	46(11.3)	4.759(2.3-9.60)	7.8(2.46-24.8)	0.00
Respondents Occupation					
Farmers	143(35.1)	189(46.4)	1		
Mixed	26(6.4)	49(12)	1.42 (0.84-2.40)	2.9(1.22-7.13)	0.016
Educational status					
cannot read & write	39(9.9)	36(8.8)	1		
can read & write	86(21.1)	130(31.9)	0.924(0.58-1.46)		0.11*
1st cycle& above	43(10.5)	72(17.7)	0.564(0.31-0.97)		

*= COR- p-value

COR=Crude odds ratio and AOR=Adjusted odds ratio and confidence intervals (95% CI) obtained from both bivariate and multivariable logistic regression)

5. Discussion

The majority of the survey respondents were rural people with little formal education whose livelihood is mainly based on agriculture.

Based on this study the overall result showed that greater than half of the respondents had good perception on CC trends, causes and effects where as 41.5% of the respondent had poor perception on CC. The levels of perception were less than study conducted in Nigeria which was 89.4%(11). The reason for this perception difference could be due to the presence or absence of information access and awarnace program and respondents level of education.

In Gondar zuria district respondents were perceived that 78.85% of the respondents agreed temperature in the area has increased**.** The result supported by studies done in Nigeria and Ethiopia (11, 19), which had 73%and 86.7% of the respondents respectively believes that temperature has been increasing over the past few decades. Substantial percentage of respondents perceived the change in the rainfall pattern. 59.7% of the respondents agree a change in the rainfall pattern. Another studies in Uganda and Kenya supported this idea peoples were perceived precipitation changes in quantity of rainfall and/or distribution over the last 30 years(15, 33).

Considering the issues of climate change, majority of the respondents (65.3%) agree that the climate (environment) has been changing over the years due human activities. The result was not similar with Study in south Africa 70% of respondents agree that humans are causing climate change, 40% felt that it occurs through the will of God.(28). 90% and 66% of the respondents revealed that deforestation and population pressure are the main human cause of climate change in the study area respectively. Even thought the result was similar with study conducted in Nigeria that the main causes of climate change, by the farmers' perception, include deforestation, overgrazing of farm lands, liquid waste and air pollution from automobile exhaust(33). They gave little credit for the poor industrial practice (28.7), agro chemicals (36%) and vehicle emission due to transportation (17%). This indicates that the rural communities have not enough awarnace about the causes of CC.

Most respondents perceived that our sustainability and health have been affected by climate change induced hazards (i.e. Droughts, Floods, river drying, agricultural Productivity decreasing, incidence of disease and disease outbreak). The finding supported by different studies conducted in Ethiopia ,Nigeria, and Uganda, that Climate change has direct and indirect impacts on prevalence and spread of pests and diseases, flood problems and drought**(7, 19, 34).**

As explained above, the majority of HHS agreed that there is a change in the climate. However, there is still a question of what factors affect HH " perception of climate change. And thus, binary and multivariate logistic regression analysis was applied to determine the significance of different independent factors (including sex, age, educational status, access to climate information, respondents knowledge, occupation, wealth index, farming experiences, and other socio demographic variables) on HH perception of climate change. The binary logistic regression analysis showed that the independent variables including respondents knowledge of CC, wealth index, access to climate information, farming experiences of the head of household, occupation and educational status were statistically significant with CC perception at p-value ≤ 0.2, but the independent variables age, sex, residence duration, educational status and marital status were not associated with HH climate change perception at p-value ≤ 0.05. However further multivariable logistic regression results showed that the educational status was not significant at p-value≤ 0.05.

The odds of good climate change perception among household heads with good knowledge of CC were 1.8 times higher than that of respondents who have poor CC knowledge (OR: 1.8, 95% CI :1.04-3.20). This indicates that more knowledgeable peoples were easily perceived and recognized the change in climate changes. Most of the HH, more than (85.3) and (80.6) of the respondents were heard and understands what climate change mean respectively. The result was less than studies conducted in Ethiopia (57.7%) of respondents heard about climate change from different sources. Another studies in Nigeria indicates 72% and 75% showed that they have knowledge and are aware of climate change(35).

The association test indicated a significant difference between the views of farm experienced and inexperienced HHS existed in climate change perception. The odds of good CC perception among study participants having farming experiences of 16-30 years,31-45 years,46-60 and above 60 years were 1.5,2.6,4 and 7.8 times higher than respondents having short (1-15) years farm experience at all p-value ≤ 0.05 respectively [(OR=1.51(2.46-24.80,(OR=2.61(1.10-2.28)OR=4.0(1.91-8.60), OR=7.8(2.46-24.8)]. This implies that more farm experienced respondents tend to perceive change in climate more than less farm experienced HH. study result was similar with study conducted in Ethiopia <<Farmers' Perception and Adaptive Capacity to Climate Change and Variability in the Upper Catchment of Blue Nile, Ethiopia>> confirmed that, most farmers with short farming experience (< 10 years) observed no change in heat intensity where as farmers with more experience (> 10 years) perceived an increase in heat intensity (17). This is long enough time to give credible evidence of climate change and its effects.

The wealth of the households surveyed has a positive and significant impact on climate change perception. The odds of good CC perception among respondents having poor, rich and very rich wealth were 2, 3.6, and 7 times higher perception than respondents who have very poor wealth respectively [(OR=2.0(1.03-3.7),(OR=3.61(1.7-7.50) OR=7.4(3.30-16)] . according to Bewket and Temesgen research result in Ethiopia wealth and information on climate change have significant effects on farmers' perceptions of climate change(17, 19). This strong association indicates that respondents who have very rich wealth can access climate change information from different sources.

Respondents Access to CC information also had strong association with HH perception towards CC. The odds of good perception among Participants who had access to climate information like radio and TV were 6.8 times higher than those respondents who had not information access (p-value= 0.00 OR=6.8(4.10-11.90).

Occupation of respondents had association with CC perception. Odds of having good CC perception among respondents, who were doing mixed activities like farming, merchants, daily laborer and employees, had 2.9 times more likely to have good CC perception than farmers (p-value= 0.016 OR=2.9(1.22-7.33).This could be explained by the fact that peoples have better opportunity to communicate and share ideas on CC during engaging mixed activities with different people at different place, than those HH practicing farm only. Studies conducted in Nigeria indicate Occupational status was significantly

associated with likelihood of having a positive attitude. From each stratum of occupational status to another, respondents were 1.3 times more likely to have a positive attitude about causes of CC than those in the lower occupational stratum (11).

6. Limitation

Since cross-sectional design was used cause effect relationship cannot be determined. Respondents were asked to recognize perceptions on climate change trend so that recall bias cannot be ruled out in this study.

7. Conclusion and recommendation

7.1. Conclusion

- The levels of CC perceptions among respondents were inadequate to mitigate and adapt the change in climate.
- Significant percents of HH perceived that changes in climate variability have effects on agricultural activities, human health, and our sustainability.
- A number of independent variables, including respondents CC knowledge, farming experience, wealth index, access to climate information and respondents occupation had significant association with HHs climate changes perception.
- Overall, this study supported the need for an increase in public education and awareness activities through communication-based interventions.

7.2. Recommendation

In order to improve community climate change perception, I recommended the following points.

- **For regional sectors (environmental, agricultural and health)**
  - All regional sectors of the government need to work hard to pursue vigorously, public enlightenment on climate change using media like television, radio and printed materials such as newspapers, leaflets, and bill boards.
- **For Local and zonal sectors (environmental, agricultural and health)**
  - Since respondents overall level of perception and the basic human causes of climate change perception were not enough, there is a need to educate and inform the community thought community based educational opportunity (farmers training centers, health centers, formal and informal education methods).
- **Institutional strengthening**
  - All level of the mass media mostly used by the people should be adapted in relation with CC.
  - Establish Institutions such as local meteorological station near to the community which provides Creating and expanding awareness programs among the population about climate change by providing reliable and up to-to-date information to get good CC perception and take appropriate adaptive measures.
  - Establish a well defined and responsible government office to coordinate and follow up the climate change issues and programs down to grass root structures.
- **Community empowerment**
  - The community should improve their access to climate information sources and use seriously all climate information sources like media, trainings, farmer's conference etc. While the government can play a leading role in response to CC, individuals and organizations must be convinced that they also have a role to play.

- **Researchers**
  - It is better to strengthen cooperation between research institutions and development organizations and other sector offices in future programming for a comprehensive awarnace creating mechanism to the changing climate effect, adaptation and mitigation mechanisms.

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9. **Annexe**s

9.1. Annex1: English and Amharic version information sheet and Consent Form Information sheet

Name of the investigator: Mulu Slute Ayalew

Name of organization: Gondar University, college of medicine and Health science institute of public Health

Name of sponsor: self

Title of the study: perception of climate change and associated factors among households in Gondar zuria district, northwest Ethiopia

Objective of the study: assessment of people's perception and associated factors on climate change among households in Gondar zuria worda, northwest Ethiopia.

Introduction: This information sheet and consent form was prepared to explain the study you are being asked to join. Please listen carefully and ask any questions about the study before you are agree to join. You may ask questions at any time.

Procedure: To assess people's perception and associated factors on climate change, we invite you to take part in this study. If you are willing to participate in this study, you need to understand and sign the agreement form. Then after, you will be interviewed by the data collector to give your response and you will be examined to patch test. You do not need to tell your name to the data collector and all your response will be kept confidentially by using coding system whereby no one will have access to your response.

Risk of the study: There is no any anticipated harm which will happen to you due to your participation, unless you feel discomfort owing to your wasted time but it is not as such long which will take about 30 minutes.

Benefit of the study: though you may not direct beneficiary of this research the information that we get from the research would help to reduce the impacts of climate change on our environment by increasing people's perception on climate change and their by practicing adaptation mechanisms.

Incentive: study participants will have no incentive or payments due to their participation

Confidentiality: The information collected from this study will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it and it will not be revealed to anyone except the principal investigator and will be kept locked with key.

Right to refuse or withdraw: you have full right to refuse from participating in this rsearch.You can choose not to respond to some or all questions if you do not want to give your response. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

English version Consent Form:

Survey questionnaire to assess perception of climate change and associated factors among households in Gondar zuria worda, northwest Ethiopia.

My name is ----------. I am working in the research team of University of Gondar college of Medicine and health sciences institute of public health Department of environmental Health and occupational safety and health. I would like to ask you a few questions about information that resulted in climate change.

Purpose: the main purpose of the research is to reduce the impacts of climate change on our environment by increasing people's perception on climate change and their by practicing adaptation mechanisms. Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. Your participation is voluntary and you are not obliged to answer any question you do not wish to answer. If you fill discomfort with the interview please fill free to drop it any time you want. This interview will take about 30 minutes. Do I have your permission to continue?

1. I f yes, continue to the next page 2. If no, skip to the next participant by writing reasons for his/ her refusal.

Name and signature of the interviewer who sought the consent_____

kebele_____ **Date of interview** _____/_____/_____

Result of interview: 1.Completed 2.Respondent not available 3.Refused 4. Partially completed

Checked by Supervisor: Name; _____Sig._____ Date_____

Persons to contact: if you have any question, you can contact

Principal investigator: Mulu Slute

Cell phone: 0918739374

E-mail:muluslute28@gmail.com

Advisor 1: Kassahun Alemu (PhD)

Cell phone: **0911752466**

E-mail: kassalemu@gmail.com

Advisor 2: Sebsibie Tadesse (Mr.)

Cell phone: **0912893304**

E-mail: sbsbtadesse90@gmail.com

Thank you in advance

ጎንደር ዩንበርስቲ ህክምና እና ጠፍ ሳይንስ ትምህርት ቤት የሚህበረሰብ ጠፍ አጠበቅ ተቋም የአካባቢ ጠፍ እና የሞያ ደህንነትእና ጠፍነት ትምህረት ክፍል በአየር ንብረት ለወጥ አሚላካከት ዙሪያ የሚከሄድ ምርምር

የጥናቱ ሚጃ ሚሰጫ የተሳታፊዎች ፍቃድኝነት ማጠየቂያ ቅጽ በአሚርኛ

1.**የጥናቱ ሚጃ ሚሰጫ**

የዋና ተመራማሪው ስም :- ሚሱ ስሉጥ አያሌው

የተቋሙ ስም፡- ጎንደር ዩኒቨርሲቲ የህብረተሰብ ጠፍ ተቋም

የምርምር ወጭ የሚሸፍነው- በተመራማሪው በግል

የጥናቱ ርዕስ :- በጎንደር ዙሪያ ወረዳ የሚኙ የቤተሰብ ሃላፊዎች በአየር ንብረት ለወጥ ያላቸው አሚላካከት ::

የጥናቱ አላማ- በጎንደር ዙሪያ ወረዳ የሚኙ የቤተሰብ ሃላፊዎች በአየር ንብረት ለወጥ ማስእኤ፣ተፀዕኖና መፍትሄ ዙሪያ ያላቸወን አሚላካከት ለማወቅ፡::

መግቢያ፡ የዚህ የሚጃና የስምማት ቅፅ የተዘጋጀው ዕርስዎ ተሳታፊ እንዲሆኑ ለተጋበዙበት በምርምር ቡድኑ የሚከሄደወን ጥናት በተመለከተ የዕርስዎን ፈቃደኝነት ለማወቅ ነው፡: የምርምር ፕሮጀከቱ በጎንደር ዙሪያ ወረዳ የሚኙ የቤተሰብ ሃላፊዎች በአየር ንብረት ለወጥ ማስእኤ፣ተፀዕኖና መፍትሄ ዙሪያ ያላቸወን አሚላካከት ለማወቅ፡::

የጥናቱ ዘዴ- የቤተሰብ ሀላፊዎች በአየር ንብረት ለወጥ ማስእኤ፣ተፀዕኖና መፍትሄ ዙሪያ ያላቸወን አሚላካከት ለማወቅ ጥያቄ ተጠይቀው ሜልስ በማጠሱ በሜረገው ጥናት ወስጥ እንዲሳተፉ የጋበዝንዎ ሲሆን ፈቃደኛ ከሆኑ ይህንን የስምማት ፎርም ይፈርማሉ፡: ከዚያ በኋላ ሚጃን በሚበስቡ የትናት ቡድኑ አባላት አማክኝነት ምላሽዎን ለማወቅ ቃለ-ማጠየቅ ይደረግለወታል፡: በቃለ-ማጠየቁ ወቅት ስምወን ማገር አያስፈልግሙ ፡የሚጠሱ ሚጃም በሚጥር የሜዝ ሲሆን በተጨሜም ማንም ሰው ወደ ሚጃው እንዲቀርብ አይደረግሙ ፡

የትናቱ ጉዳት-ተሳታፊው በዚህ ጥናት ወስጥ በማተፋቸው የሜርስባቸው ምንም አይነት ጉዳት የለሙ፡ ተሳታፊው የሚጠው የቃለ ማጠይቅ ሚጃም በሚጥር ስለሜዝ ተሳታፊው ከአስተዳደራዊ ጫ ነፃ ነው፡:

የጥናቱ ጥቅም- ተሳታፊው በጥናቱ ተሳታፊ በመሆናቸው በቀጥታ የሚኙት ጥቅም ባይኖርም ከዚህ ጥናት የሚኘው ወጤት የግንዛቤ ማስጫ ፕሮግራሞችን ለማሻሻል ከማዘም በተጨሜ ለድረጅቶችና ሌሎች ማስል ተመሳሳይ ጥናቶች እነደማሻ ግብዐት ያገለግላል፡:

የጥናቱ ወጤት ለአካባቢ ጥበቃ ቢሮና ሌሎች የሚሳከታቸው ተቋማት ይፋ በሜድረግ በስራ ቦታ የአካባቢ ጥበቃ ስራ እንዲሰራና የግንዛቤ መፍጠሪያ ስልቶች እንዲሻሻሉ ያደርጋል፡:

ሚስጥራዊነቱ፡ በዚህ ጥናት የሚበሰበው ሚጃ ሚጠራዊነቱ የተጠቀ ሲሆን ሚጃወም ሥማዎን ሳይጨሜር በፋይል ተደርጎ ሚጠራዊ ኮድ ተሰጥቶት ተቆልፍ ይቀመጣል፡: በተጨሜም የሚጠሱ ሚጃ ከዋናው አጥኝ በስተቀር ለማንም ግልፅ አይደረግሙ ፡

የመቃወምና የሜረጥ መበት- በዚህ ጥናት ላይ የመሳተፍም ሆነ ያለ መሳተፍ ሙሉ መበትዎ የተጠቀ ነው፡: በመሳተፍ ላይ እያለም በማንኛወም ስአት ሜረጥ ወይም ከጥያቄዎቹ ወስጥ ለመሻለስ የሜፈልጉት ጥያቄካለ አለመሻለስ ይቻላል፡:

የተሳታፊዎች ፍቃድኝነት ማጠየቂያ ፎርም

ይህ ማጠይቅ በጎንደር ዙሪያ ወረዳ የሚኙ የቤተሰብ ሃላፊዎች በአየር ንብረት ለወጥ ያላቸው አሚላካከትና ለዚሁ ምክንያት የሆኑ ነገሮችን ጥናት ለማጥናት የተዘጋጀ ነው፡:

ጠፍ ይስጥልኝ----------እባላለሁ፡፡እዚህ የመጣሁት ይህን ጥናት ለማካሄድ የጎንደር ዩንበርስቲ ህክምና እና ጠፍ ሳይንስ ትምህርት ቤት የሚበረሰብ ጠፍ አጠባበቅ ተቁም የአካባቢ ጠፍ እና

Questionnaire English and Amharic version

North Gondar zone Gondar zuria Woreda ----------kebele , Questionnaire identification number ----------

PART I: household head demographic characteristics

የማያ ደህንነትእና ጠፍነት ትምህረት ክፍል በድን አባል ሁኘ ነው፡፡

ከዚህ በመቅጠል ስለ አየር ንብረት ለውጥ ያለውትን አመለካከት በተመለከተ ጥያቄዎችን ልጠይቀዎት እወዳለሁ፡፡ከርስዎ የሚኘው መልስ በሀገራችን ለሚከናወነው የአየር ንብረት ለውጥን መከላከል ከፍተኛ እገዛ ይኖረዋል፡፡

ከርስዎ የምገኛቸውን ማንቸውም መልስ በሚስጥር እንጠበቃልን፡፡ከዚህ ጥናት ጋር በተያያዘ በማንቸውም ቦታና ጊዜ ስምዎ እንደሚጠፉና እንደሚጠቀስ ልንገልጽዎ እንወዳለን፡፡በአጠቃላይ ማከይቁ 30 ደቂቃ የሚወስድ ሲሆን በጥናቱ የምሳትፈዎት የእርስዎን መሉ ፈቃደኝነት ስናገኝ ብቻ ነው፡፡በማከይቁ ሂደት ለመመለስ የሚፈልጉትን ጥያቄዎች ያለመመለስ መበትዎ የተጠበቀ ነው፡፡

በጥናቱ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ ወደ ሚቀጥለው ይሸጋገሩ፡፡
2. የለም ፈቃደኛ ያልሆኑበትን ምክነያቶች በመጻፍ ወደ ሌለ ተጠየቂ ይሸጋገሩ፡፡

ፈቀደኛነቱን የገለጸው ተጠየቂ ሥም----------ፊርማ----------ቀበሌ----------ጎጥ------

ውጤት፡ - 1 ተሟልቷል 2.ተጠየቂው አልተገኘም 3.ተቃወሞ 4.በከፊል ተሟልቷል

የሚጃ ሰብሳቢው ስም----------ፊርማ----------ቀን----------

ለተጨማሪ መረጃ

ተመራማሪው ስም፡ - መሉ ስሉጥ አያሌው

ስልክ፡0918739374፣ **E-mail:**muluslute28@gmail.com

አማክሪዎች

1ኛ: ዶ/ር ካሳሁን አለሙ (PhD)

ስልክ: **0911752466 , E-mail:** kassalemu@gmail.com

2ኛ: አቶ ሰብስቤ ታደስ (BSC, MPH)

ስልክ: **0912893304, E-mail:** sbsbtadesse90@gmail.com

9.2. Annexes2.

S .on	Question	Responses	skip
101	Age of the respondent	----- year	
102	Sex of respondent	1.Male 2.Female	
103	duration of residence (year)	------ year	
104	Current occupation of the household	1.Farmer 2.Trader 3.Farmer and merchant 4.Daily laborer 5.civile servant	
105	Farming experience?	--------- year	
106	Religion of respondent	1.Orthodox 2.Muslim 3.Protestant 4.Other (specify)	
107	Marital Status:	1.Single 2.Married 3.Divorced 4.Widowed	
108	Education Status:	1. Cannot Read & Write 2. Can Read & Write 3. First cycle complete 4. Secondary education complete 4.Higher education complete	

PART II: Household socio-economic characteristics			
201	Indicate your monthly income	---------birr	
202	Indicate your farm size	------ha.	
203	Do you have the following animals? 1. Cattle 2. Goat 3. Sheep 4.Chicken 5. Donkey 6. mule 7. Total	 1. Yes 2. No if yes Number_____ 1. Yes 2. No if yes Number_____ 1. Yes 2. No if yes Number_____ 1. Yes 2. No if yes Number_____ 1. Yes 2. No if yes Number_____ 1. Yes 2. No if yes Number_____ Number_____	
204	Do you have your own house?	1. Yes 2. No	
205	If yes, what types of constriction materials used for the following parts? 1.Roof 2.Wall 3.floor 4.door	 1.metal sheet 2.grass 1.wood 2.Bloket 1. mud 2.cement 1.wood 2. Metal sheet 3. Lamera	
206	Do you have the follwing properties? 1. Radio 2. Television 3. Mobile 4. Grinding mail 5. generator 6. Bicycle 7. Fridge 8. Sofa 9. Privet toilet 10. car 11. private drinking water 12. private electric source	 1. Yes 2. no 1. Yes 2. no 1. Yes 2. no 1. Yes 2. no 1. Yes 2. No 1. Yes 2. no 1. Yes 2. no 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No	

PART III: household head knowledge on climate change			
301	Have you heard of the word "climate change" before?	1.Yes 2.No	
302	Do you know what "climate change" mean?	1.Yes 2.No	
303	Do you know the cause of climate change?	1.Yes 2.No	

304	Do you know the effect of climate change?	1.Yes 2.No	
305	Do you know the solution of climate change?	1.Yes 2.No	
306	Do you know regional and federal environmental laws and regulations?	1.Yes 2.No	
3073	Do you know that drought related with deforestation?	1.Yes 2.No	
308	Do you know that temperature related with air pollution?	1.Yes 2.No	
309	Do you know that rainfall related with climate change?	1.Yes 2.No	
310	Do you know that flooding related with global warming?	1.Yes 2.No	
311	Do you know that human disease related with climate change?	1.Yes 2.No	
312	Do you know that agricultural productivity related with climate change?	1.Yes 2.No	
313	Do you know that river drying related with climate change	1.Yes 2.No	
314	Do you know that your government is doing anything about climate change?'	1.Yes 2.No	
315	If you heard about climate change, From which source you heard about climate change?	1. Radio 2.School 3. Colleague 4.training 5.Television 6.Newspaper	
316	If you are not heard about climate change what are reasons do you think?	1. Lower educational status 2. Lack of institutional supporting about such information 3. Absence of awareness program. 4. Disclosure to mass media	

PART 1V: household head perception to climate change trend in the past 20 years?			
401	To what extent do you agree or disagree that climate has been changing in the past 20 years?	1.Strongly Agree 2.Agree 3.No opinion 4.Disagr 5.Strongly Disagree	
402	From your experience how much do you agree or disagree that temperature has been increasing for the last 20 years?	1.Strongly Agree 2.Agree 3.No opinion 4.Disagr 5.Strongly Disagree	
403	From your experience do you agree or disagree that rainfall pattern has been changing for the last 20 years?	1. Strongly Agree 2. Agree 3. No opinion 4. Disagree 5. Strongly Disagree	
household head perception to climate change causes			
404	Do you agree or disagree that climate change is caused by Human actions.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagr 5.Strongly Disagree	
405	Do you agree or disagree that climate change is caused by Natural factors.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagr 5.Strongly Disagree	
406	Do you agree or disagree that climate change is caused by Human and natural factors .	1.Strongly Agree 2.Agree 3.No opinion 4.Disagr 5.Strongly Disagree	
407	Do you agree or disagree that climate change is caused by Wrath of God.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagr 5.Strongly Disagree	
About effect of climate change to what extent do you agree or disagree with the following phenomenon?			
408	The incidence of climate change will affect the sustainability of our environment.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
409	Changes to the climate will have a direct impact on me	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	

410	Human health will affect by climate change	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
411	There have been climate change induced-hazards in the past 20 years?	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
412	Drought is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
413	Crop Pest is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
414	Human diseases are climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
415	Flooding is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
416	Water shortage is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
417	Damage of infrastructure is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
418	Forced to migration is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
419	Landslide is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
420	Agricultural Productivity decrease is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
421	Drying rivers is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
422	Disease epidemic is climate change induced hazard.	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
	Household perception to climate change adaptation.		
423	Do you agree or disagree that it is possible to adapt the impacts of climate change induced-hazards?	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
424	Do you agree or disagree that it is possible to mitigate the impacts of climate change induced-hazards?	1.Strongly Agree 2.Agree 3.No opinion 4.Disagree 5.Strongly Disagree	
425	Which of the following Human actions do you think is/are the main cause of climate change? (Multiple answers are possible).	1.Over cultivation 2.Overgrazing 3.Deforestation 4.Forest Fires 5.Using Agrochemicals 6.Population pressure 7.Use of fossil fuels 8.Poor industrial practices 9.Solid and Liquid waste 10.Airpollution 11.Transportation,(Vehicle emissions)	
426	What local indicators do you use to evaluate the temperature change in the area? (Multiple answers are possible).	1. Prevalence of newly introduced human and animal disease (Malaria and other disease) 2. Prevalence of newly introduced plant and animal species (goat in highland)	

		3. Change in clothing style (dressing light cloths) 4. Dry up of rivers and streams 5. Habitat shift towards higher location 6. Damage of crops by pests	
427	What local indicators do you know to evaluate the rainfall trend in the area? (Multiple answers are possible).	1. Loss of some animal and plant species 2. Increased drought frequency 3. Increased flood frequency 4. crop Growing period shortened 5. Rainfall comes early 6. Rainfall comes lately 7. Decline of agricultural yields 8. Decreased available water	
428	What local actions do you think are possible within your capacity? (Multiple answers are possible).	1. Reforestation 2. Enhance irrigation 3.Use of organic manure 4.Stops cultivation of sloppy area 5.Soil and water conservation 6.Family planning 7.Rainwater harvesting 8.Change in cropping pattern 9.Diversified income 10.Growing short maturing crops	

በሰሜን ጎንደር ዞን ጎንደር ዙሪያ ወረዳ ------- ቀበሌ

በጎንደር ዙሪያ ወረዳ የቤተሰብ ሃላፊዎች በአየር ንብረት ለወጥ (መዛባት) ዙሪያ ያላቸውን አመለካከት ለማጥናት የተዘጋጀ የአሚኮኛ ማጠይቅ

የጣቢቁ ሚነያ ቁጥር ----------			
ክፍል 1፡ ግላዊ ሚጃ			
ተ.ቁ	**ጥያቄ**	**ምላሽ**	
101	እደሜዎ ምን ያህል ነ ው?	----- ዓመት	
102	ፆታ	1. ወንድ 2. ሴት	
103	በቀበሌውለምንያህል ጊዜ ቆይተዋል?	----- ዓመት	
104	የሥራ ሁኔታ	1.አርሶ አደር 2.ነ ጋዴ 3.አርሶ አደርና ነ ጋዴ 4. የ ጉልበት ሠራተኛ 5.የ ማሰራተኛ	
105	በግብርና ስራ ምን ያህል ልምድ አለዎት?	------ ዓመት	
106	ሀይማኖትዎ ምንድን ነ ው?	1.አርቶዶክስ 2.ሙስሊም 3.ፕሮቴስታንት 4.ሌላ ካለ-----	
107	የ ጋብቻ ሁኔታ	1. ያገ ቡ 2. ያላገ ቡ 3. የ ተለያዩ 4. የ ሞቱባቸው	
108	የ ትምህርት ሁኔታ	1. ማንበብና መፃ ፍ የ ሚችሉ 2. ማንበብና መፃ ፍ የ ማቻሉ 3.1ኛ ደረጃ ያጠ ቀቁ 4.2ኛ ደረጃ ያጠ ቀቁ 5. ኮሌጅና ዩኒ ቨርስቲ ያጠ ቀቁ	
ክፍል 2. የ ቤተሰብ ኢኮኖሚሁኔታ			
201	መርሃ ዊ ገ ቢዎት ምን ያህል ነ ው?	------- ብር	
202	ምን ያህል የ እርሻ መሬት ማጠ ነ አለዎት?	------ ሄ/ር	
203	ቀጥሎ የ ተዘ ረዘ ሩት እን ስሳት አለዎት? 1.ከብት 2.ፍየ ል 3.በግ 4.ደሮ 5.አህያ 6.በቅሎ 7.ደምር	 1.አዎ 2.የ ለምአዎ ካሉ ምን ያክል-------- 1.አዎ 2.የ ለምአዎ ካሉ ምን ያክል-------- 1.አዎ 2.የ ለምአዎ ካሉ ምን ያክል-------- 1.አዎ 2.የ ለምአዎ ካሉ ምን ያክል-------- 1.አዎ 2.የ ለምአዎ ካሉ ምን ያክል-------- 1.አዎ 2.የ ለምአዎ ካሉ ምን ያክል-------- ---------	
204	የ ራስዎ ቤት አለዎት?	1.አዎ 2.የ ለም	
205	ተ.ቁ 204 ሚልስዎ አዎ ከሆነ ቤቱ የ ተሰራበት ቁሳቁስ ምንድን ነ ው? 1.ጣሪያው 2.ግድግዳው 3.ወለሉ 4.በርና መስኮት	 1.ቆርቆሮ 2.ሳር 1.እንጨት 2.ብለኬት 1.አፈር 2.ሊሾ 1.እንጨት 2.ቆርቆሮ 3.ላሜራ	
206	ቀጥሎ የ ተዘ ረዘ ሩት ንብረቶች አለዎት 1. ሬዲዩ 2. ቴሌቪዥን 3. ሞባይል 4. የ እህል ወፍጮ 5. ጀኔ ሬተር 6. ሳይክል 7. ፍሪጅ 8. ሶፋ 9. የ ግል መጓ ዳኛ 10. መኪና 11. የ ግል ወሀ 12. የ ግል ኤሌክትሪክ መብራት	 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም 1.አዎ 2.የ ለም	
ክፍል 3. በቤተሰብ ሃላፊ ደረጃ የ አየ ር ንብረት ለወጥ የ እወቀት መለኪያ ጥያቄዎች			
301	የ አየ ር ንብረት ለወጥ(መዛ ባት) የ ሚለወጡ ቃላት ሰምተውያወቃሉ?	1. አዎ 2. የ ለም	
302	ሰምተውየ ሚወቁ ከሆነ አየ ር ንብረት ለወጥ ምን ማለት እንደሆነ ያወቃሉ?	1. አዎ 2. የ ለም	

303	የአየር ንብረት ለውጥ መንስኤዎችን ያውቃሉ?	1.አዎ 2. የለም	
304	የአየር ንብረት ለውጥ ተፅዕኖዎችን ያውቃሉ?	1.አዎ 2. የለም	
305	ለአየር ንብረት ለውጥ መፍትሄዎችን ያውቃሉ?	1.አዎ 2. የለም	
306	የሃገሪቱናየክልሉየአካባቢጥበቃህግናደንቦችንያውቃሉ?	1.አዎ 2. የለም	
307	ድርቅ ከደን ወደመት ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
308	የአካባቢ መቅት ሜዜሮ ከአየር ብክለት ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
309	የዝናብ ስርጭት መዛባት ከአየር ንብረት ለውጥ ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
310	ጎርፍ ክስተት ከአለምመቅት መዜሮ ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
311	የበሽታ ወረርሽኝ ከአየር ንብረት ለውጥ ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
312	የግብርና ምርት መቀነስ ከአየር ንብረት ለውጥ ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
313	የወንዞች መድረቅ ከአየር ንብረት ለውጥ ጋር ግንኙነት መኖሩን ያውቃሉ?	1.አዎ 2. የለም	
314	መንግስት በአየር ንብረት ለውጥ ዙሪያ የሚሰራውን ስራ ያውቃሉ?	1.አዎ 2. የለም	
315	በተ.ቁ. 301 ስለ አየር ንብረት ለውጥ ሰምተው የሚያውቁ ከሆነ በምን መንገድ ሰሙ?	1. በሬዲዮ 2. በትምህርት ቤት 3. ከጓደኛ 4. በስልጠና 5.በቴሌቪዥን 6. በጋዜጣና መጽሄት	
316	በተ.ቁ. 301 ስለ አየር ንብረት ለውጥ ሰምተው የሚያውቁ ከሆነ ምክንያቱ ምን ይመስለዎታል?	1. ዝቅተኛ የትምህርት ሁኔታ መኖር 2. ይህንን የሚመለከት ተቋም አለመኖር 3. የግንዛቤ ማስጨበጫ ፕሮግራም አለመኖር. 4. የመገናኛ ብዙሀን አለማግኘት	

ክፍል 4. የቤተሰብ ሃላፊ ባለፉት 20 ዓመታት በአየር ንብረት ለውጥ ሁኔታ ያላቸውን አመለካከት ማስቀመጥ

401	ባለፉት 20 ዓመታት የአየር ንብረት እየተለወጠ ለመሆኑ ምን ያህል ይስማሙ ወይም አይስማሙ?.	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
402	ባለውት ልምድ መቅት እየጨመረ ለመጣጡ ምን ያህል ይስማሙ ወይም አይስማሙ?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
403	ባለዎት ልምድ የዝናብ ማጠንና ስርጭት እየተለወጠ ለመጣጡ ምን ያህል ይስማሙ ወይም አይስማሙ?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	

የቤተሰብ ሃላፊ በአየር ንብረት ለውጥ መንስኤ ያላቸውን አመለካከት ማስቀመጥ

404	ለአየር ንብረት ለውጥ መንስኤ .የሰውልጅ ተግባር ለመሆኑ ምን ያህል ይስማሙ ወይም አይስማሙ?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
405	ለአየር ንብረት ለውጥ መንስኤ የተፈጥሮ ምክንያት ለመሆኑ ምን ያህል ይስማሙ ወይም አይስማሙ?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
406	ለአየር ንብረት ለውጥ መንስኤ በሰውና በተፈጥሮ ምክንያት ለመሆኑ ምን ያህል ይስማሙ ወይም አይስማሙ?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
407	ለአየር ንብረት ለውጥ መንስኤ የእግዛብሄር ቁጣ ለመሆኑ ምን ያህል ይስማሙ ወይም አይስማሙ?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	

ቀጥለውበተዘረዘሩት የአየር ንብረት ለውጥ ውጤቶች (ክስተቶች) ምን ያህል ይስማሙ ወይም አይስማሙ ፡

408	የአየር ንብረት ለውጥ መከሰት የአካባቢ ዘላቂነትን ይነዳል.	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
409	የአየር ንብረት ለውጥ መከሰት በእኔ ላይ ቀጥተኛ ተፅዕኖ አለው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	
410	የአየር ንብረት ለውጥ በሰውጤነት ላይ ጉዳት ያደርሳል.	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላውቅም 4. አልስማማም 5. በጣም አልስማማም	

411	ካለፉት 20 ዓመታት ጀምሮ በአየር ንብረት ለውጥ ሳቢያ አደጋዎች ነበሩ.	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
412	ድርቅ በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
413	የሰብል ተባይ በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡ .	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
414	የሰውበሽታ በአየር ንብረት ለውጥ ሰበብ የሚከሰት ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
415	ጎርፍ በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
416	የወሀ እጥረት በአየር ንብረት ለውጥ ሰበብ የሚከሰት ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
417	የማረተ ልማት መሻሻል በአየር ንብረት ለውጥ ሰበብ ይከሰታል.	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
418	ስደት በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
419	የሜት መሻሸራተት በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
420	የግብርና ምርት መቀነስ በአየር ንብረት ለውጥ ሰበብ የሚከሰት ችግር ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
421	የወንዞች መድረቅ በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
422	የወረርሽኝ በሽታ በአየር ንብረት ለውጥ ሰበብ የሚከሰት አደጋ ነው፡	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
የአየር ንብረት ለውጥን በመላመድ በኩል የአሰላካከት ማዘይቅ			
423	የአየር ንብረት ለውጥ ተፅዕኖን መላመድ (መቋቋም) ይቻላል በሚለው ሀሳብ ምን ያህል ይስማማሉ ወይም አይስማማም?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
424	የአየር ንብረት ለውጥ(መዛባት) ተፅዕኖን መቀነስ (መከወገድ) ይቻላል በሚለው ሀሳብ ምን ያህል ይስማማሉ ወይም አይስማማም?	1. በጣም እስማማለሁ 2. እስማማለሁ 3. አላወቅም 4. አልስማማም 5. በጣም አልስማማም	
425	ከሰው ልጅ ተግባር ወጭ ለአየር ንብረት ለውጥ (መዛባት) ምክንያቶች ዋናዎቹ የትኞቹ ናቸው ብለው ያምናሉ?. (ከአንድ በላይ መምረጥ ይችላሉ)	1.አላግባብ (ከመጠን) ያለፈ እርሻ 2.ልቅ ግጦሽ 3.ደን መመንጠር(መጨፍጨፍ) 4.የደን ቃጠሎ 5.የግብርና ኬሚካል መጠቀም 6.የህዝብ ብዛት 7.ማዕድን ለሃይል ምንጭመጠቀም 8.የኢንዱስትሪ መለቀቆት 9.የደረቅና ፈሳሽ ቆሻሻ 10.የአየር ብክለት መኖር 11.ትራንስፖርት (መኪኖች---)	
426	በአካባቢዎት ያለውን መቀት ለውጥ ለመላመም ቀጥለው ከተዘረዘሩት መካከል ምን ጠቋሚ ነገሮችን ይመለከታሉ? (ከአንድ በላይ መምረጥ ይችላሉ)	1. የሰውና የእንስሳት በሽታ ክስተት/ወባና ሌሎች 2. አዳዲስ የዕጽዋትና እንስሳት ዝርያ መታየት 3. የአለባበስ ዘይቤመለወጥ 4. የወንዞችና የምንጮች መድረቅ 5. ከነባር መኖሪያ ቦታዎች ወደ ከፍተኛ ቦታ መቀየር 6. ሰብል በተባይ መጎዳት	
427	በአካባቢዎት ያለውን የዝናብ ለውጥ ለመላመም ቀጥለው ከተዘረዘሩት መካከል ምን ጠቋሚ ነገሮችን ይመለከታሉ?. (ከአንድ በላይ መምረጥ ይችላሉ)	1. የአንዳንድ እፅዋትና እንስሳት ዝርያመጥፋት 2. የድርቅ ደግግሞሽ መጨመር 3. የጎርፍ ደግግሞሽ መጨመር	

		4. የሰብል ዕድገት ጊዜ ማጠር 5. የዝናብ ቀደሞ መምጣት 6. የዝናብ ዘግይቶ መምጣት 7. የግብርና ምርት መቀነስ 8. የወሃ መጎዎች መቀነስ	
428	አየር ንብረት ለወጥን (መዛባት) ለመቋቋም በህብረተሰቡ አቅም ምን ስራ መስራት ይቻላል ብለው ያስባሉ ? (ከአንድ በላይ መምረጥ ይችላሉ)	1. የደን ሜልማት 2. የመስኖ ልማት ማስፋፋት 3. የተፈጥሮ ማዳበሪያ መጠቀም 4. ተዳፋታማቦታዎችን አለመጠቀም 5. የአፈርና ወሃ ጥበቃ 6. የቤተሰብ ምጣኔ 7.የዝናብ ወሃ ማስባሰብ 8. የሰብል ልማት ዘይን መቀየር 9.የገቢ ምንጮችን ማስፋት 10.ተሰዶ ደራሽ ሰብሎችን ሜልማት	

Declaration paper

I, the under signed senior MPH in environmental health science student declared that this thesis is my original work in partial fulfillments of the requirement for the degree of masters of public health in environmental health science.

Name ----------

Signature ----------

Date ----------

Place of submission: institute of Public Health College of medicine and health science, university of Gondar.

Date of submission ----------

This thesis work has been submitted for examination with our approval as university advisors.

Advisors name	signature	date
1st. Dr. Kssahun Alemu (PhD)	----------	----------
2nd. Mr. Sebsibye Tadesse (BSC, MPH)	----------	----------